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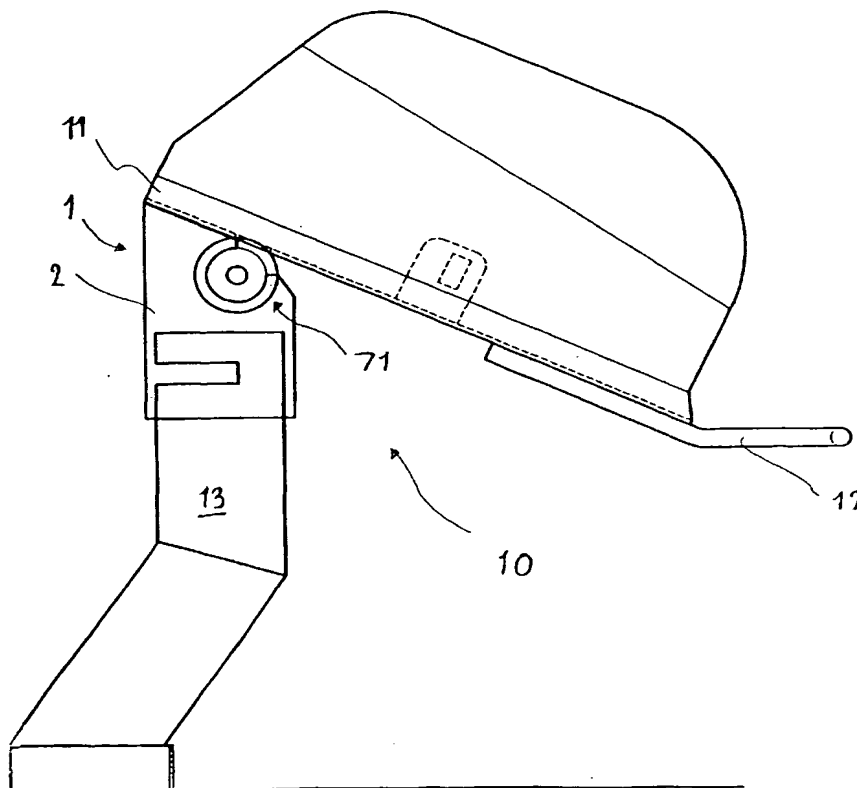
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[Continued on next page]

(54) Title: A ROTATABLE LINK



(57) Abstract: The invention relates to a rotatable link, which may e.g. be incorporated in an upright. The upright may be used e.g. in connection with a support for a card terminal. The rotatable link may be characterized as a rotary friction link. Compressive forces caused by a mechanical tension in a pipe are transferred via two first objects to a second object clamped between them. The two first objects are secured and partly built into the pipe, and the second object is rotatable relative to the pipe. The second object constitutes a rotatable link part on which a plate may be welded to provide an upright.

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## A ROTATABLE LINK

5 The invention relates to a rotatable link, e.g. for use in connection with a support for a piece of hardware, such as a card terminal. Moreover, the invention relates to a rotatable upright. In addition, the invention relates to use of a rotatable upright for the mounting thereon of an object, such as a piece of hardware, e.g. a card terminal.

### Prior art

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Rotatable links, such as ball bearings, are known. A special type of ball bearings has an applied tension between the balls in the link and the face on which they move during rotation. This applied tension results in an increased friction in the movement of the balls, and the link may be characterized as sluggish in the rotary movement. However, the friction decreases in the use of the link so that the sluggishness is reduced, and frequent adjustments of the applied tension are required to maintain the sluggishness.

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### Objects of the invention

20

It is an object of the invention to provide a rotatable link which requires few post tensionings during the service life of the link.

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It is an object of the invention to provide a rotatable link which is inexpensive to manufacture.

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It is an object of the invention to provide a rotatable upright having a plate so that the plate may be moved by hand in a rotary movement.

It is an object of the invention to provide a rotatable link for use for a plate on which a piece of hardware, such as a card terminal, may be secured,

link and rotatable upright.

### DESCRIPTION

- 5 According to an aspect of the present invention, there is provided a rotatable link as defined in claim 1.

The rotatable link may be described as a rotary friction link. The rotary link has a certain sluggishness which is owing to friction in the parts of the link.

10

- In an embodiment, the pipe is a pipe stub which is short measured in the longitudinal direction relative to the diameter of the pipe. In an embodiment, the pipe is round. The pipe may also be elliptic. The pipe may also be made of metal, such as a steel alloy. The pipe may be deformed elastically. The thickness of the pipe depends on the material of the pipe and on the load which the link is to be capable of carrying and rotating. The pipe has two ends which each have a rim. Part of the one rim constitutes contact faces for the first objects. The rim may be shaped so as to form a support for the first objects in order to create contact along the first object in such as 25% or more of the circumference of the first object, such as 50% or more of the circumference of the first object, such as 75% or more of the circumference of the first object. The remaining part of the one rim constitutes two rim sections. The rim sections may be configured such that they have notches and cut-outs therein. In an embodiment, the one rim section forms part of a plane which forms an angle of 0-40° with the horizontal, such as 10-30° with the horizontal, and the other rim section is part of a plane which forms an angle of 40-80° with the horizontal, such as 50-70° with the horizontal. In an embodiment, a pawl is provided in the interior of the pipe, extending from the interior of the pipe wall inwards toward the centre of the pipe.

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In an embodiment, the area of an end face of a first object, said end face being the one closest to the second object, is smaller than the area of the end faces of the second object, for each of the first objects.

- 5 In an embodiment, the unit is secured with its longitudinal direction perpendicular to the longitudinal direction of the pipe.

By assembling the first objects and the second object with the attachment means into a unit, it is ensured that the objects are kept together about a  
10 common axis which constitutes the axis of rotation of the link.

By providing a unit like the foregoing one and mounting it in a pipe, a simple and inexpensive rotatable link consisting of few components is provided.

- 15 When the mechanical tension in the pipe produces compressive forces from the walls of the pipe inwards toward the centre of the pipe, this causes the link to be sufficiently slack for it to be affected by hand, while the link is also sluggish.

- 20 In addition, as a result of the mechanical tension in the pipe the attachment means need not be tightened very much in the assembly of the objects, for the given desired sluggishness. Thus, the attachment means is not very prone to work loose, resulting in few post tightenings.

- 25 A mechanical tension in the pipe may be detected by separating the second object from the unit and then measuring the distance between the two first objects. If the distance between the two first objects is smaller, when the second object has been separated from the unit, than the length of the second object, this indicates that a mechanical tension was present in the pipe  
30 before the second object was separated from the unit. The distance and the length are measured in the direction of the bores.

In an embodiment, the apertured disc is a spring disc.

In an embodiment, there are one pair of apertured discs of one material and three pairs of apertured discs of another material.

5

In an embodiment, there are one pair of apertured discs of brass and three pairs of apertured discs of steel.

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According to an aspect of the present invention, there is provided a rotatable upright as stated in claim 5.

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Thus, there is provided an upright which, in addition to being sufficiently slack to be affected by hand, is also suitably tight so that the plate maintains its position after forces have been exerted by hand, and even if objects are mounted on the plate, and a moment is produced about the axis of the rotatable link.

20

The plate may be secured to the rotatable link part by welding. In an embodiment, the plate is secured with a large face to the rotatable link part.

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According to an aspect of the present invention, there is provided a rotatable upright as stated in claim 6.

By providing an upright according to claim 6, forces may readily be applied by hand to effect a rotary movement of the rotatable link by gripping the handle. The handle may be shaped as a strap or the like.

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According to an aspect of the present invention, there is provided a rotatable upright as stated in claim 7.

In an embodiment, the attachment of the unit to the pipe is performed by welding. In an embodiment, it is ensured by the welding that the pipe is deformed elastically, and that the elastic deformation thereby contributes to a mechanical tension in the pipe.

5

In an embodiment, a mechanical tension in the pipe may be achieved by first applying a mechanical deformation of the pipe, thereby deforming the pipe mechanically, and then attaching the unit so that a mechanical tension is maintained after the application of the mechanical deformation has been discontinued.

10

According to an aspect of the present invention, there is provided a method as stated in claim 10.

15 In an embodiment, the mechanical tension of the pipe may be changed by adding/removing one or more pairs of discs after the unit has been secured to the pipe. This provides a simple manner in which the mechanical tension in the pipe may be changed.

20 Detailed description

#### Brief description of the drawings

Embodiments of the invention will be illustrated below by means of examples with a detailed description of preferred embodiments. Reference  
25 is made to the figures in which:

fig. 1 shows an embodiment of the invention, illustrating an upright comprising a rotatable link, a plate and a handle;

30

the large cylinder 4 such that a disc 8 is disposed between each of the small cylinders 3 and the large cylinder 4. One of the small cylinders 3 has threads for the machine screw 5 into which the machine screw 5 is screwed. The small cylinders 3 and the large cylinder 4 are of compressed round steel and the discs 8 are of brass.

The small cylinders 3, the discs 8 and the large cylinder 4 are assembled with the machine screw 5, see figure 2, and constitutes a unit 71 as described above and indicated in figure 3. The above-mentioned unit 71 is welded to a pipe stub 2, see figure 3. At one end the pipe stub 2 is cut at an angle of about 20° perpendicularly to the longitudinal direction of the pipe stub 2, and two openings 6 are milled in this inclined pipe edge. The two openings 6 in the inclined pipe edge form the contact face for welding to the two small cylinders 3 of the unit 71. The link 1 is shown assembled and mounted in figure 4. In the mounted state, the pipe 2 is slightly elastically deformed by being expanded slightly in the direction of the machine screw 5. This gives rise to a compressive force of an elastic nature on the unit 71 from the pipe stub 2 inwards toward the centre of the unit 71, see the arrows of force in figure 4. In the mounted link 1, it is only the large cylinder 4 which is rotatable (and partly the discs 8), whereas the two small cylinders 3 are fixed and integrated with the pipe stub 2.

Welding of the plate 11 takes place on the large cylinder 4, see figure 1 for a plate 11 welded on a link 1.

#### Mode of operation

The pipe stub 2 applies a force to the unit 71. The force is generated by the elastic deformation of the pipe stub 2 and acts along the axis of the link 1 from both sides of the pipe stub 2 inwards toward the centre of the unit 71.

are provided in the rotatable link 1. Between a first cylinder 3 and a second cylinder 4 and in the mentioned order and on each side of the second cylinder 4, there are: an apertured disc 82 of a first material and three apertured discs 81 of a second material. In this example the first material is brass, and the second material is steel. The second material may be spring steel. The second cylinder 4 and the two first cylinders 3 are made of sulphur-alloyed free-cutting steel in this example. The pipe 2 is cut with two rim sections, and the upper rim section is produced such that it comprises a step. One rim section is part of a plane that forms an angle of about  $20^\circ$  with the horizontal, and the other rim section is part of a plane that forms an angle of about  $60^\circ$  with the horizontal. In this example, there is a hole in the wall of the pipe 2 in its lower area shown by a cantilever in profile in figure 6b. A pawl may be inserted through this hole into the interior of the pipe 2, extending from the interior of the pipe wall inwards toward the centre of the pipe 2. If the pipe 2 is mounted on a rod 13 having a slot, the pawl has the function of controlling the rotary movement in that the pawl is present in the slot during the rotary movement. See figure 1 for an example of a slot in a rod 13.

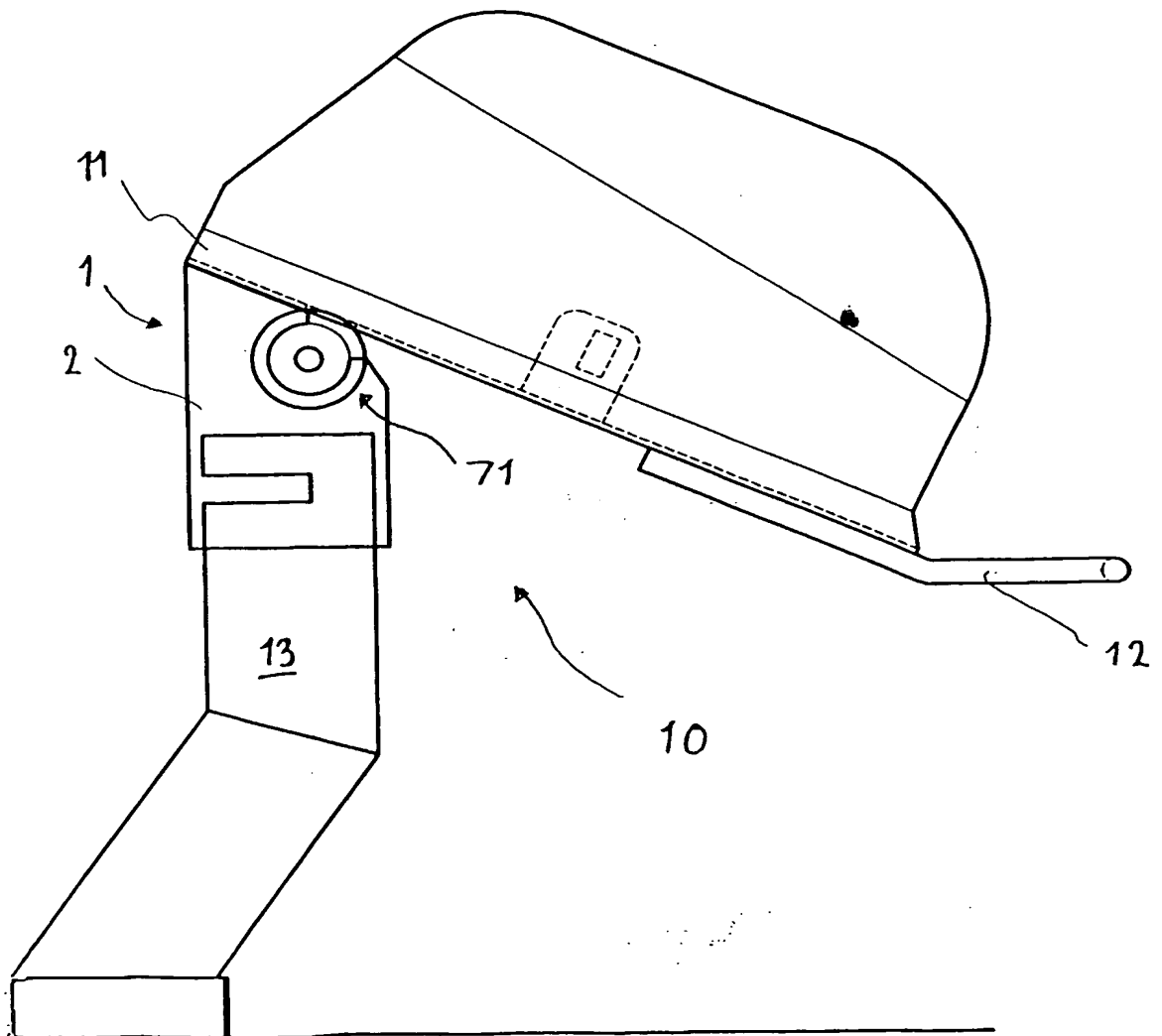
Figures 1, 5a and 5b show examples of uprights 10 in embodiments of the invention. Figure 1 shows an upright 10 mounted on a horizontal face. A description of the upright 10 is given below, based on the mounted part of the upright 10 on the horizontal face. The upright 10 comprises a foot secured to an object, which is in turn secured to the rod 13. The object, shown here as a rod part, is secured in extension of the rod 13 with its longitudinal direction different from the longitudinal direction of the rod 13. The rod 13 is a circular hollow pipe and has a slot configured as a section in the rod 13 near the end of the rod 13, and the rod 13 has an outside diameter approximately equal to and smaller than the inside diameter of the pipe 2. A pipe 2 is disposed around and connected to the rod 13. A pawl (not shown) may be mounted in the pipe 2, engaging the slot such that the pipe 2 is kept

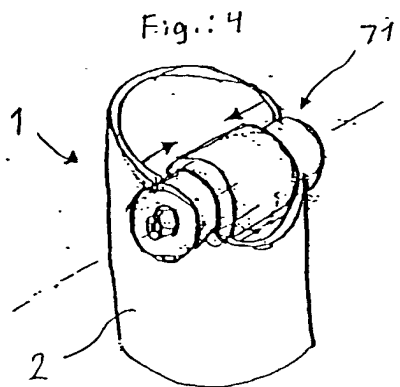
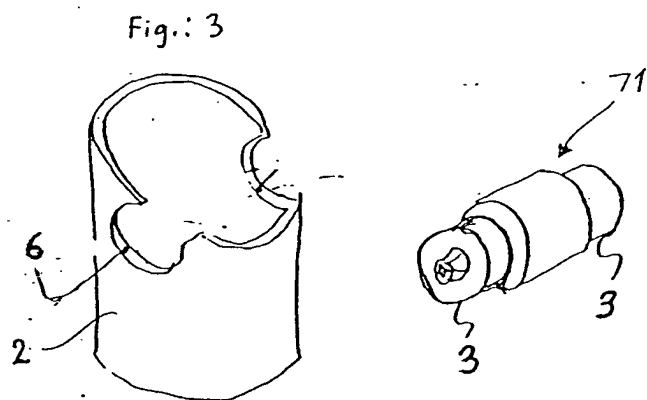
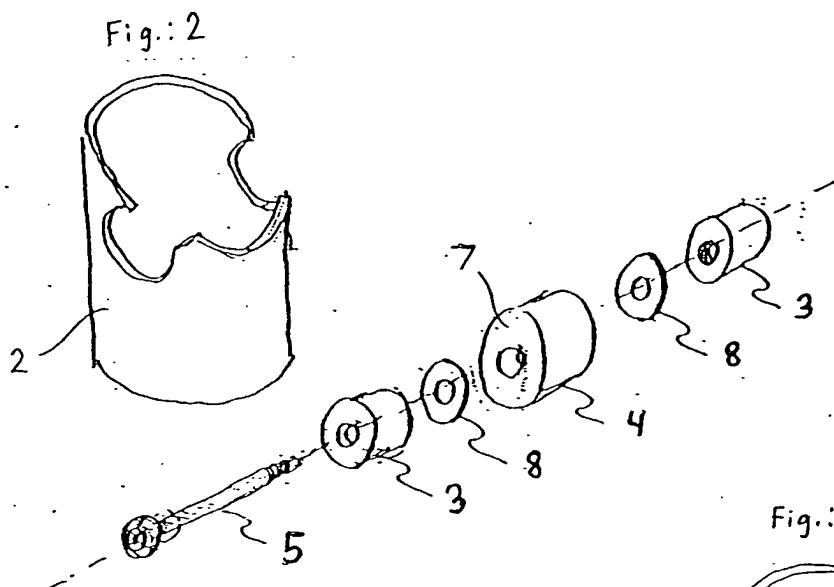


**PATENT CLAIMS**

1. A rotatable link (1), comprising a pipe (2), two first objects (3) each having a bore, a second object (4) having a bore, and an attachment means (5) extending through said bores and assembling, in said order, a first object (3), the second object (4) and a first object (3) into a unit (71), wherein the two first objects (3) are secured to the pipe (2) on a part of the area of a rim (6) for the pipe (2), thereby providing a mechanical tension in the pipe (2) which is transferred as compressive forces in the longitudinal direction of the attachment means (5) to the second object (4), which forms a link part rotatable relative to the two first objects with an axis of rotation along the longitudinal axis of the attachment means (5).
2. A rotatable link (1) according to claim 1, additionally comprising one or more pairs of apertured discs (8), wherein it applies to each pair of apertured discs (8) that the apertured discs (8) of a pair are disposed on their respective sides of the second object (4) between this and a first object (3) and with the attachment means (5) through the hole in the apertured discs (8).
3. A rotatable link (1) according to claim 2, wherein the number of pairs of apertured discs (8) is two or more, such as three or more, such as four or more.
4. A rotatable link (1) according to claims 2-3, wherein apertured discs (8) are made of a material selected from the following substances: plastics and metal, such as brass and steel.
5. A rotatable upright (10), comprising a rotatable link (1) according to any one of the preceding claims on which a plate (11) is secured on the rotatable link part.

Fig.: 1





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Fig.: 5a

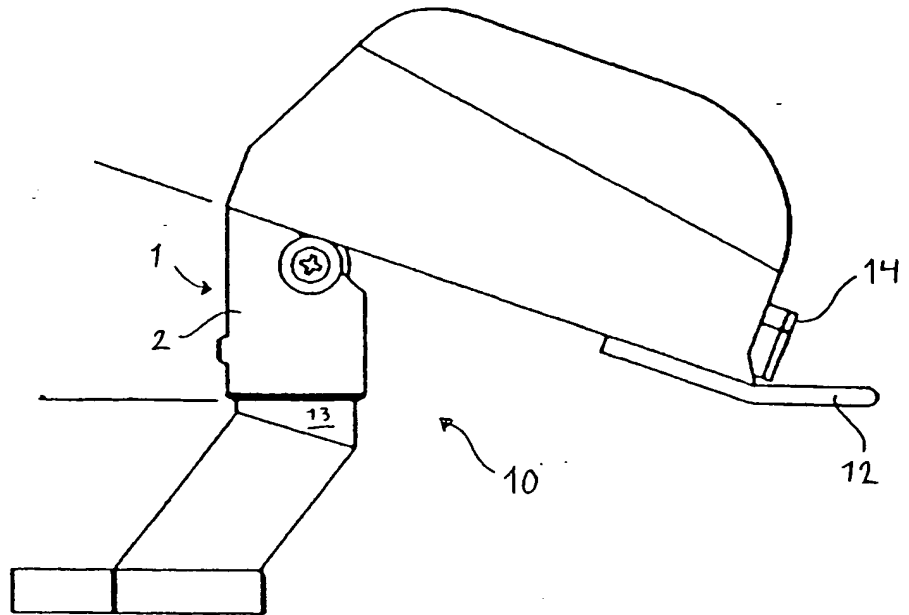
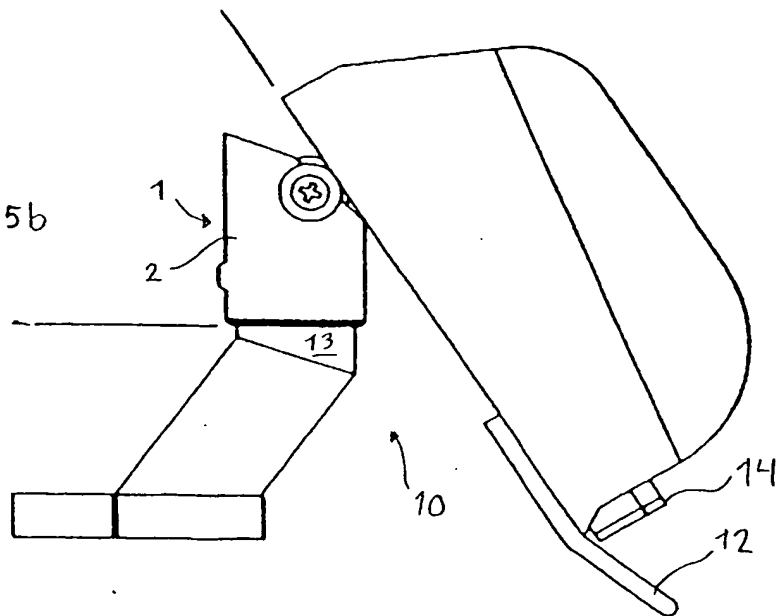


Fig.: 5b



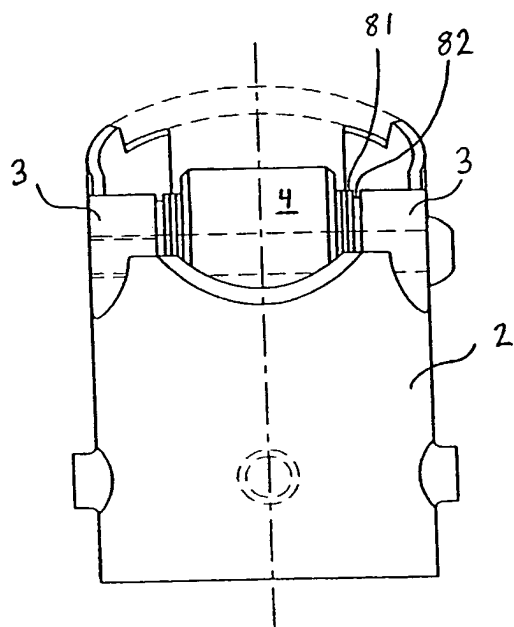


Fig.: 6a

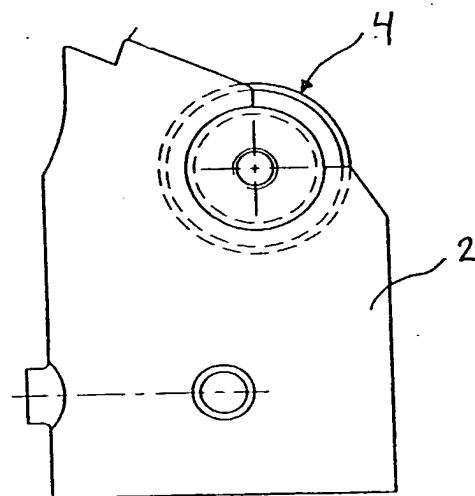


Fig.: 6b